HWCI 3.6
Azimuth Positioner

ULDB
PDR

3.6
Attitude
Control

- Requirements Traceability
  - DTRD Section 3.6.1.2 & 3.6.3.2
    - Sun-tracking azimuth pointing of the entire gondola & fixed solar panel with an accuracy of +/- 5 degrees
- Trade Studies

Concept	Feasibility/Driver	Risk/Driver
LDB Azimuth SPS pointer	High / Meets requirements for Demo Flight	Low / Flight Proven
New design for suspended solar array	Medium / Schedule-Cost	Medium / Unproven

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- Functional and Performance Requirements
  - **3.6.a** Sun-track, in azimuth, a 3500lb. Suspended gondola with an accuracy of +/- 5 degrees.
  - **3.6.b** Use less than 5 watts of power during steady state tracking and less then 20 watts during initial alignment.
  - **3.6.c** Communicate to the main flight computer via RS-232 interface. System will transmit house keeping status data (i.e.. relative azimuth position) and receive up-linked commands.

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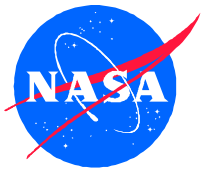

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- Functional and Performance Requirements
  - **3.6.d** Transmit housekeeping data to the LOS PCM stack via a second RS-232 interface.
  - **3.6.e** Allow independent power switching of the onboard electronics and the torque motor.
  - **3.6.f** Allow feed-through (slip-ring) of 2-22 gauge shielded twisted pair and 4-16 gauge wires
  - **3.6.g** Operate in the flight environment.
  - **3.6.h** Maintain structural integrity during flight termination (i.e.. 10g loading during chute deployment).

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- HWCI Description
  - Physical Dimensions
    - Weight 112 lbs.
    - Height 29.29 in.
    - Width 16.0 in.
  - Electrical Power Draw
    - Continuous solar tracking 4 Watts
    - "Morning" acquisition (software limited) 18 Watts
    - Electronics and Heaters on (Night Mode) 14 Watts

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- HWCI Description
  - Interfaces
    - Power 28V
      - Separate supply connectors for electronics and motor
    - Communication - Two RS-232 interfaces
      - Comm 1 communicates with flight computer at 9600 baud to send house-keeping data packets every 30 seconds and receive up-linked commands.
      - Comm 2 transmits house-keeping data packets to the LOS Stack at 2400 baud once per second.
    - Slip Ring
      - Provides 20 feed-through lines rated at 10 amps ea.

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- Risk Assessment & Mitigation/Reliability
  - 2 LDB flights and 1 engineering test flight
    - Maintained +/- 1 degree of accuracy and survived flight environment
    - Electronics survived 1st LDB flight/recover; Were refurbished as backup units for the 2nd LDB flight.
    - Structurally survived 10g load during chute deployment.
  - Wallops in-house expertise of design, test, and integration.

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Verification and Accountability

HWCI Para No.	Description	Verif. Method
3.6.a	Sun tack +/- 5 degrees	Test (flight history)
3.6.b	5 watt steady state / 20 watt initial	Test (flight history)
3.6.c	RS-232 comm1 w/ flight commuter	Test (flight history)
3.6.d	RS-232 comm2 to LOS PCM encoder	Test (flight history)
3.6.e	Indepent power switching (motor, elect.)	Test (flight history)
3.6.f	Slip-ring	Test (flight history)
3.6.g	Operate in flight environment	Test (flight history)
3.6.h	Flight termnination (10g loading)	Test (flight history)